2007 | REGIONAL QUALITY REPORT

U.S. Northern Grown Durum Wheat

Montana • North Dakota

Making Premium Pasta

DURUM—is the hardest of all wheats. Its density, combined with its high protein content and gluten strength, make durum the wheat of choice for producing premium pasta products. Pasta made from durum is firm with consistent cooking quality. Durum kernels are amber-colored and larger than those of other wheat classes. Also unique to durum is its yellow endosperm, which gives pasta its golden hue.

When durum is milled, the endosperm is ground into a granular product called semolina. A mixture of water and semolina forms a stiff dough. Pasta dough is then forced through dies, or metal discs with holes, to create hundreds of different shapes.

Durum production is geographically concentrated to the Northern Plains because it demands a special agronomic environment. The states of North Dakota and Montana in most years jointly produce 80 percent of the U.S. durum crop. Farmers in California and Arizona grow the remainder.

2007 Overview

The 2007 durum crop produced in North Dakota and Montana is 45 percent larger in production compared to 2006, and boasts a very high grade profile with good pasta processing qualities. Production was higher due to a nearly 15 percent increase in planted area and yields about 20-30 percent above 2006. Kernel qualities of the crop are very similar to 2006's high quality crop, with somewhat greater thousand kernel weights and vitreous kernel counts. End-use processing tests indicate very good color parameters but slightly weaker gluten properties.

The crop averages a No. 2 Hard Amber Durum, the same as in 2006, as the average test weight of 59.9 pounds per bushel was just short of the needed 60 pounds. However fifty-one percent of the crop makes a No. 1 HAD, compared to only thirty-five percent last year. Test weight distributions show over one-half of the crop to be greater than 60 pounds per bushel (78 kg/hl), though some western areas are showing lower test weights due to the extended hot period late in the season.

A drier bias to the second half of the growing season and favorable harvest conditions promoted a crop with low damaged kernels, low moisture, high falling numbers and strong vitreous kernel counts. Nearly three-fourths of the crop has greater than ninety percent vitreous kernels and nearly ninety percent has a greater than 350 seconds falling number. The average protein level of 15.1 percent is the same as 2006 but there is a shift in distribution to more mid-protein levels. In 2007, fifty percent of the crop is concentrated in the 13 to 14.9 percent range, compared to more than one-half of the crop, greater than 15 percent last year and with one-third in the mid-protein range.

Milling extractions are lower than both 2006 and the five-year average,

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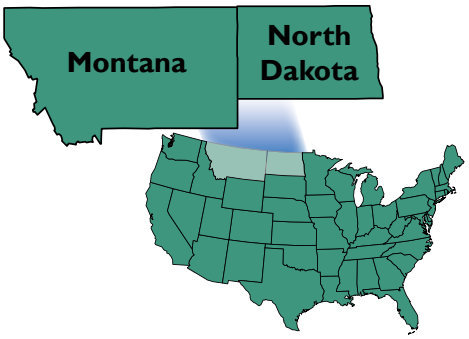
Cover photo: David Lipp, Fargo, N.D.



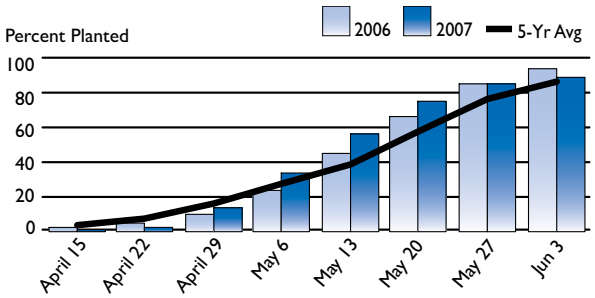
and semolina ash is higher. Semolina speck counts are similar to 2006 and the five-year average. Gluten strength in the crop, as measured by the Gluten Index and the Mixograph indicates a weaker mixing crop compared to last year. Cooked pasta properties are showing a slight improvement over 2006 in color scores and cooked weight, although cooked firmness is somewhat lower.

Buyers will find the 2007 crop will more than meet their needs for making high quality pasta, couscous and other products due to the overall level of kernel soundness, high protein content and strong color. Prudent contract specifications are always recommended to ensure buyers get the best quality for the sharply higher market values posted in 2007.

SEASONAL CONDITIONS

PLANTING began in mid-April and progress was behind average due to cool, wet conditions in parts of the region. Planting progressed rapidly in May as warmer, drier conditions prevailed. Planting was delayed near the end of the season due to precipitation, but was mostly finished by mid-June.

DURUM PLANTING PROGRESS



GROWING conditions in June were beneficial as plentiful moisture crop development initiated high plant counts and formed high yield expectations. Crop condition ratings were excellent and no quality concerns were present through much of June. In the second half hot, dry conditions during July and August stressed the crop and pushed maturity ahead of normal. Yield potential was adversely affected in some areas, but the conditions helped to minimize disease pressure and quality prospects remained high, as crop maturity advanced ahead of normal.

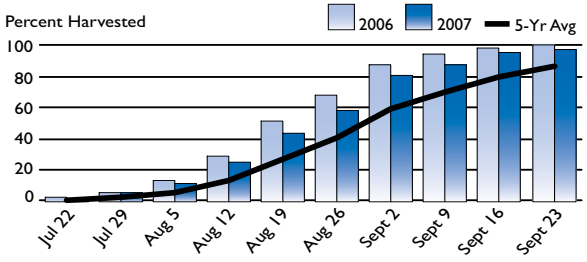
HARVEST began in early August, ahead of average due to the hot, dry conditions that pushed maturity. Harvest progressed fairly rapidly and was completed by mid-September, hindered only by periodic rainshowers.

DURUM WHEAT PRODUCTION

	2006	2007	2002-06 AVERAGE
MILLION BUSHELS			
Montana	6.7	11.4	13.7
North Dakota	31.5	43.8	52.0
Regional Total	38.2	55.2	65.7
U.S. Total	53.5	71.7	83.1
MILLION METRIC TONS			
Montana	0.18	0.31	0.37
North Dakota	0.86	1.19	1.42
Regional Total	1.04	1.50	1.79
U.S. Total	1.46	1.95	2.26

Source: USDA September 2007 Small Grains Summary

DURUM HARVEST PROGRESS



Wheat Characteristics

WHEAT GRADES, as defined by the Federal Grain Inspection Service (FGIS) of the USDA Grain Inspection, Packers and Stockyards Administration (GIPSA), reflect the general quality and condition of a representative sample. U.S. grades are based on test weight and include limits on damaged kernels, foreign material, shrunken and broken kernels, and wheat of contrasting classes. Each determination is made on the basis of the grain when free from dockage and shrunken and broken kernels.

SUBCLASSES

Subclass is a separate marketing factor based on the weight percentage of kernels with a complete, hard and vitreous endosperm, the portion that makes semolina. For durum wheat the subclasses are:

- Hard Amber Durum (HAD)—at least 75 percent or more hard, vitreous kernels;
- Amber Durum (AD)— between 60 and 74 percent hard, vitreous kernels;
- Durum (D)—less than 60 percent hard, vitreous kernels.

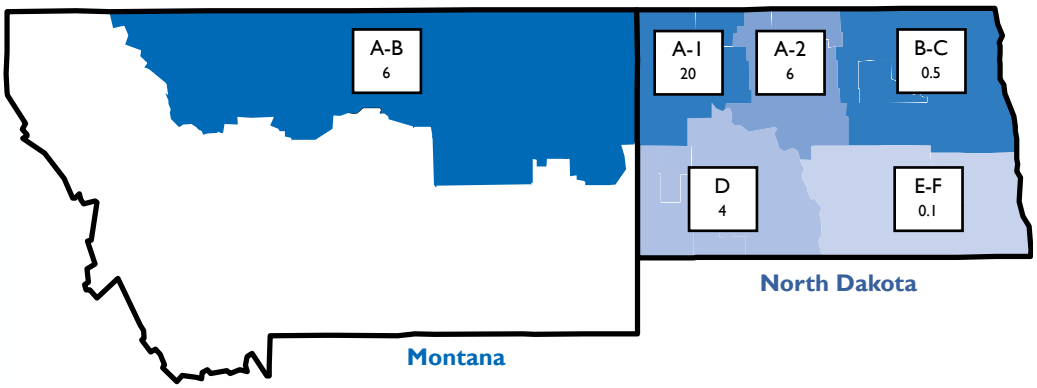
OFFICIAL U.S. GRADES AND GRADE REQUIREMENTS (Revised June 1993)

GRADING FACTORS	U.S. GRADES 1	2	3	4	5
DURUM—MINIMUM TEST WEIGHTS					
Pounds per bushel	60.0	58.0	56.0	54.0	51.0
Kilograms per hectoliter	78.2	75.6	73.0	70.4	66.5
MAXIMUM PERCENT LIMITS OF:					
Damaged kernels					
Heat (part of total)	0.2	0.2	0.5	1.0	3.0
Total	2.0	4.0	7.0	10.0	15.0
Foreign material	0.4	0.7	1.3	3.0	5.0
Shrunken/ broken kernels	3.0	5.0	8.0	12.0	20.0
Total[1]	3.0	5.0	8.0	12.0	20.0
Wheat of other classes[2]					
Contrasting classes	1.0	2.0	3.0	10.0	10.0
Total[3]	3.0	5.0	10.0	10.0	10.0
Stones	0.1	0.1	0.1	0.1	0.1
MAXIMUM COUNT LIMITS OF:					
Other material					
Animal filth	1	1	1	1	1
Castor beans	1	1	1	1	1
Crotalaria seeds	2	2	2	2	2
Glass	0	0	0	0	0
Stones	3	3	3	3	3
Unknown foreign substances	3	3	3	3	3
Total[4]	4	4	4	4	4
Insect-damaged kernels in 100 grams	31	31	31	31	31

U.S. Sample grade is wheat that:
(a) Does not meet the requirements for U.S. Nos. 1, 2, 3, 4, or 5; or
(b) Has a musty, sour, or commercially objectionable foreign odor (except smut or garlic odor); or
(c) is heating or of distinctly low quality.
1 Includes damaged kernels (total), foreign material, and shrunken and broken kernels.
2 Unclassed wheat of any grade may contain not more than 10.0 percent of wheat of other classes.
3 Includes contrasting classes.
4 Includes any combination of animal filth, castor beans, crotalaria seeds, glass, stones, or unknown foreign substance.

Wheat samples were obtained in Montana and North Dakota in the crop reporting areas identified in color. Samples were gathered during harvest from growers, farm bins and country elevators.

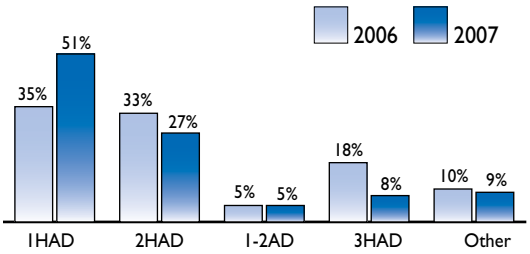
CROP REPORTING AREAS & 2006 DURUM WHEAT PRODUCTION (million bushels)



Source: National Agricultural Statistics Service
(2007 county estimates to be released in March)

Photo credit: David Lipp, Fargo, N.D.

REGIONAL GRADE DISTRIBUTION

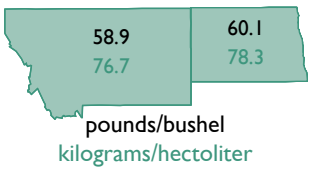


Seventy-eight percent of 2007 samples grade No. 2 HAD or better, up from 68 percent in 2006.

OVERALL GRADE

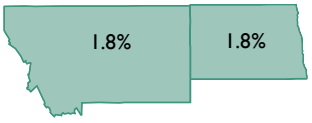
The average grade for the region is 2HAD. This grade represents average test weight of 59.9 pounds per bushel (78.0 kg/hl), total defects of 1.8 percent and vitreous kernel content of 95 percent.

TEST WEIGHT BY STATE

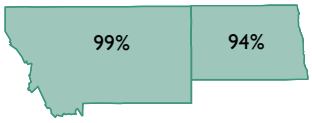


pounds/bushel
kilograms/hectoliter

AVERAGE TOTAL DEFECTS BY STATE



AVERAGE VITREOUS KERNELS BY STATE

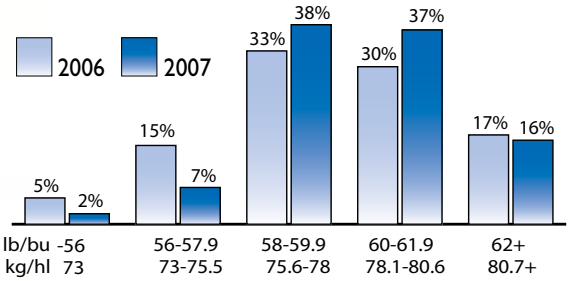


Wheat Grading Data

STATE AND CROP REPORTING AREA	TEST WEIGHT LBS/BU	TEST WEIGHT KG/HL	DAMAGE %	FOREIGN MATERIAL %	SHRUNKEN/ BROKEN KERNELS %	TOTAL DEFECTS %	CONTRASTING CLASSES %	U.S. GRADE	VITREOUS KERNELS %
MONTANA (A-B)									
State Avg. 2007	58.9	76.7	0.2	0.0	1.6	1.8	0.0	2HAD	99
State Avg. 2006	59.3	77.2	0.2	0.0	2.1	2.3	0.0	2HAD	97
NORTH DAKOTA									
Area A-1	60.0	78.2	0.0	0.0	1.5	1.5	0.0	1HAD	97
Area A-2	60.8	79.2	0.7	0.1	1.1	1.9	0.9	1HAD	94
Area B-C	59.6	77.6	3.8	0.0	1.1	4.9	0.4	2HAD	79
Area D	59.8	77.9	0.2	0.0	1.2	1.4	0.2	2HAD	92
State Avg. 2007	60.1	78.3	0.5	0.0	1.3	1.8	0.3	1HAD	94
State Avg. 2006	60.0	78.2	0.3	0.0	1.6	1.9	0.2	1HAD	88
TWO-STATE REGION									
Avg. 2007	59.9	78.0	0.4	0.0	1.4	1.8	0.2	2HAD	95
Avg. 2006	59.9	78.0	0.2	0.0	1.7	2.0	0.1	2HAD	90
Five-Year Avg.	60.7	79.0	0.7	0.0	1.3	2.0	0.1	1HAD	89

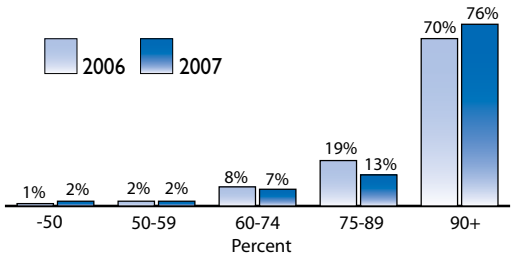
All state and regional averages have been adjusted to reflect production differences.

REGIONAL TEST WEIGHT DISTRIBUTION



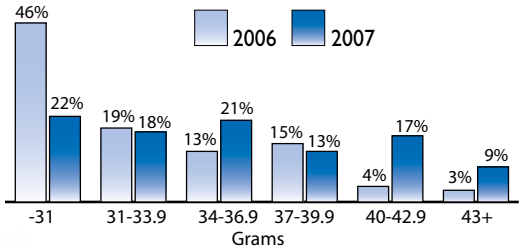
Fifty-three percent of 2007 samples have test weights of 60 lbs/bu (78.1 kg/hl) or greater. The regional average test weight is 59.9 lbs/bu (78.0 kg/hl), the same as in 2006.

REGIONAL VITREOUS KERNEL



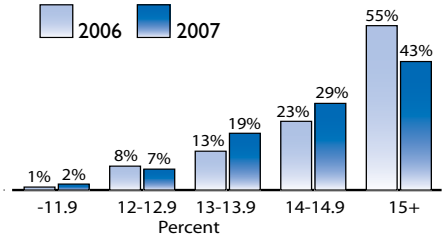
Eighty-nine percent of 2007 samples have 75 percent or greater vitreous kernels. The average percentage of vitreous kernels in the regional crop is 95 percent.

REGIONAL THOUSAND KERNEL WEIGHT DISTRIBUTION



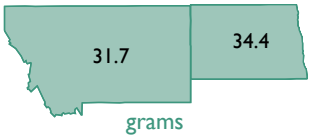
The 2007 crop has 60 percent of the crop with a thousand kernel weight of 34 grams or higher compared to only 35 percent in 2006.

REGIONAL PROTEIN DISTRIBUTION (12% moisture basis)

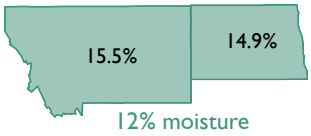


Ninety-one percent of 2007 samples have a protein content of 13.0 percent or greater.

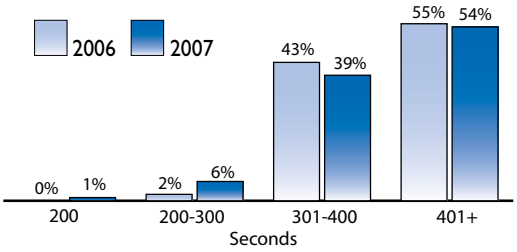
THOUSAND KERNEL WEIGHT BY STATE



AVERAGE PROTEIN BY STATE

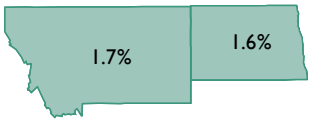


REGIONAL FALLING NUMBER

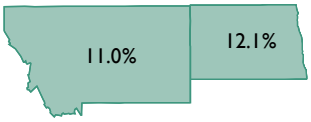


Nearly ninety-five percent of the 2007 crop has a falling number of 350 seconds or better.

AVERAGE HARVEST DOCKAGE BY STATE



AVERAGE MOISTURE BY STATE

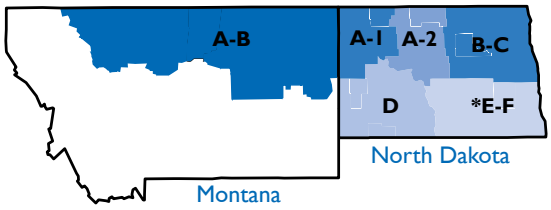


Other Kernel Quality Data

STATE AND CROP REPORTING AREA	DOCKAGE %	MOISTURE %	1000 KERNEL WEIGHT G	KERNEL DIST. MEDIUM %	KERNEL DIST. LARGE %	PROTEIN (DRY MATTER) %	PROTEIN (12% MOISTURE) %	WHEAT ASH %	FALLING NUMBER (SEC)	SEDIMENT-ATION (CC)
MONTANA (A-B)										
State Avg. 2007	1.7	11.0	31.7	76	14	17.6	15.5	1.70	380	50
State Avg. 2006	1.7	10.3	30.2	67	15	18.5	16.3	1.56	422	61
NORTH DAKOTA										
Area A-1	2.0	12.0	33.8	65	26	17.0	15.0	1.62	377	51
Area A-2	1.2	12.6	34.1	53	41	16.8	14.8	1.70	375	59
Area B-C	1.4	12.6	37.6	36	60	15.5	13.6	1.65	298	46
Area D	1.1	11.4	35.1	59	34	17.7	15.5	1.77	334	50
State Avg. 2007	1.6	12.1	34.4	59	33	17.0	14.9	1.67	363	52
State Avg. 2006	2.5	11.5	33.8	65	26	16.8	14.8	1.52	377	54
TWO-STATE REGION										
Avg. 2007	1.6	11.8	33.8	63	29	17.1	15.1	1.67	367	52
Avg. 2006	2.3	11.3	33.2	65	24	17.1	15.1	1.53	385	55
5-Year Avg.	1.5	11.8	35.9	46	47	16.0	14.1	1.56	360	49

All state and regional averages have been adjusted to reflect production differences.

Photo credit: David Lipp, Fargo, N.D.



* E-F: No data was collected from this region due to limited production.

Milling Characteristics

Total extraction represents the portion of the kernel that can be milled into flour and semolina. **SEMOLINA** extraction is the portion milled into semolina only.

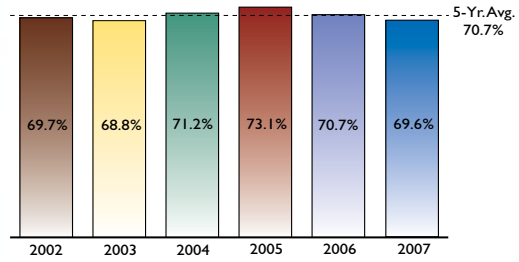
ASH CONTENT in the endosperm of durum is inherently higher than in the endosperm of other hard wheats, but can still be used as a relative measure of bran or mineral content in the flour and semolina.

SPECKS appear in semolina when small particles of bran or other material escape the cleaning and purifying process. Millers can control speck count by selecting durum that is free of disease and foreign material, thoroughly cleaning the durum, properly tempering and conditioning the wheat before milling, and by using purifiers to remove small bran particles from the semolina.

PROTEIN CONTENT in semolina has a high correlation with gluten content and, in turn, mechanical strength and cooking quality. Wet gluten is a quantitative measure of the gluten forming proteins in semolina that are primarily responsible for its mechanical strength and pasta quality.

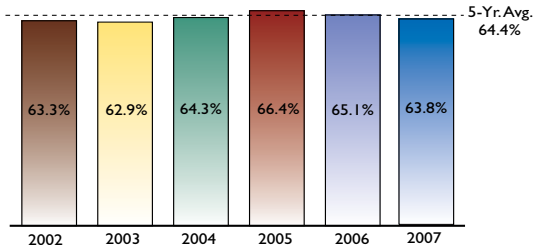
MIXOGRAM curves reveal important information about the gluten quality of semolina and ultimately about the potential cooked firmness of pasta. Mixograms are rated on a scale of 1 to 8, with the higher values indicating strong mixing characteristics.

REGIONAL AVERAGE: TOTAL EXTRACTION



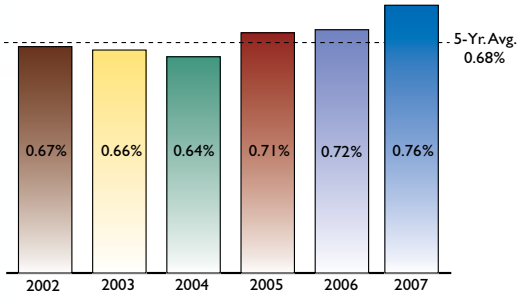
The regional average is 69.6 percent, down from last year's 70.7 percent.

REGIONAL AVERAGE: SEMOLINA EXTRACTION



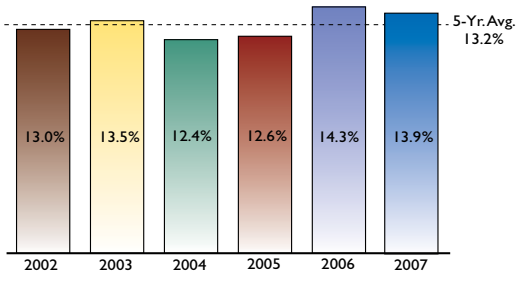
The regional average is 63.8 percent, down from last year's 65.1 percent and just below the five year average of 64.4 percent.

REGIONAL AVERAGE: ASH CONTENT



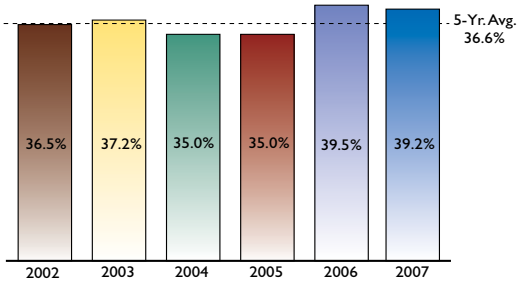
The 2007 crop produced semolina with an average ash content of 0.76 percent, higher than last year and the five-year average.

REGIONAL AVERAGE: SEMOLINA PROTEIN CONTENT



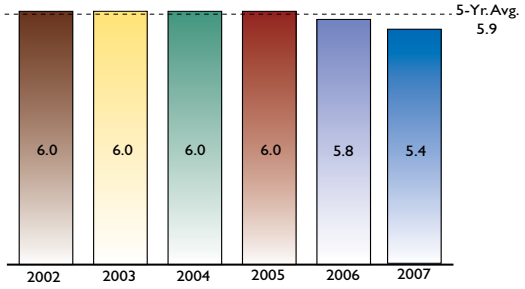
The 2007 crop produced semolina with an average protein content of 13.9 percent, slightly lower than last year but higher than the five-year average.

REGIONAL AVERAGE: WET GLUTEN



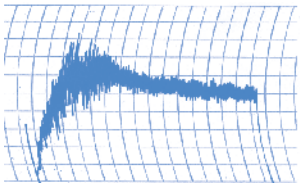
Average wet gluten content for the 2007 crop is 39.2 percent, slightly lower than last year but higher than the five-year average.

REGIONAL AVERAGE: MIXOGRAM CLASSIFICATION



The regional average mixogram score is 5.4 (on a scale of 1 to 8), lower than last year and the five-year average.

REGIONAL AVERAGE MIXOGRAM



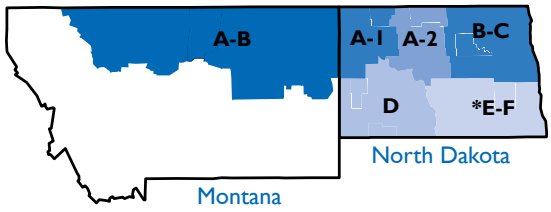
A 5.4 mixogram classification on a scale of 1 to 8 indicates strength.

Semolina Quality Data

STATE AND CROP REPORTING AREA	TOTAL EXTRACTION %	SEMOLINA EXTRACTION %	ASH %	SPECKS NO/10 SQ IN	PROTEIN %	WET GLUTEN %	GLUTEN INDEX %	MIXOGRAM[1] CLASSIFICATION SCALE 1-8
MONTANA (A-B)								
State Avg. 2007	69.4	64.1	0.80	13	14.3	39.8	45.8	5
State Avg. 2006	70.4	65.1	0.79	17	15.6	43.1	56.6	6
NORTH DAKOTA								
Area A-1	69.1	63.4	0.76	23	13.8	39.3	43.9	5
Area A-2	69.8	63.6	0.70	23	13.8	39.3	55.4	6
Area B-C	70.9	64.1	0.78	47	12.6	34.7	63.0	6
Area D	70.3	64.8	0.80	27	14.3	39.9	48.3	6
State Avg. 2007	69.6	63.7	0.76	25	13.8	39.1	48.5	5.5
State Avg. 2006	70.7	65.2	0.70	21	14.0	38.7	56.7	5.8
TWO-STATE REGION								
Average 2007	69.6	63.8	0.76	23	13.9	39.2	48.0	5.4
Average 2006	70.7	65.1	0.72	21	14.3	39.5	56.7	5.8
5-Year Average	70.8	64.4	0.68	20	13.2	36.6	45.0	5.9

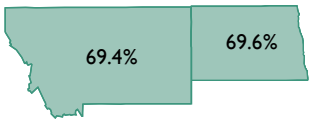
Note: All state and regional averages have been adjusted to reflect production differences.

[1]See reference mixograms for durum wheat on page 15.

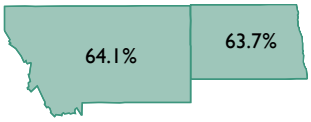


* E-F: No data was collected from this region due to limited production.

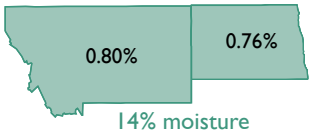
AVERAGE TOTAL EXTRACTION BY STATE



AVERAGE SEMOLINA EXTRACTION BY STATE

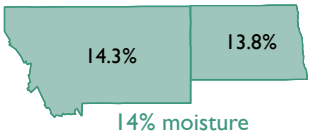


AVERAGE ASH CONTENT BY STATE



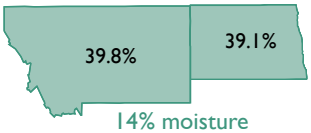
14% moisture

AVERAGE SEMOLINA PROTEIN CONTENT BY STATE



14% moisture

AVERAGE WET GLUTEN BY STATE



14% moisture

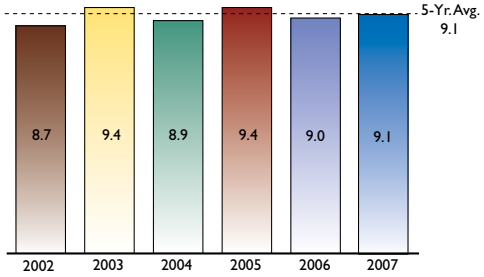
Pasta Characteristics

DRY PASTA PROCESSORS want a finished product that is visually appealing, elastic and strong enough to resist breakage during cutting, packaging, handling and shipping, able to withstand the rigors of cooking, and satisfying to the consumer palate.

YELLOW COLOR in semolina and pasta is a traditional, rather than functional, mark of quality. In the early days of the pasta industry, before sophisticated testing evolved, consumers assumed that a yellow pasta was made from durum wheat, which is known to make pasta with superior cooking quality compared to that made from other hard wheats.

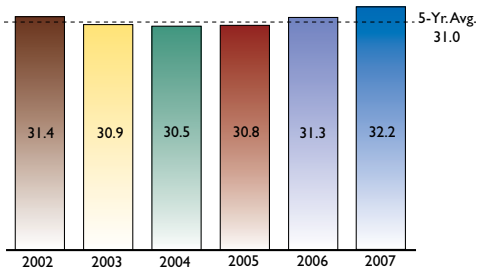
Most consumers prefer pasta that is **"AL DENTE,"** meaning it has some firmness to the bite. Good quality pasta that is cooked according to package directions should not be sticky or mushy when eaten.

REGIONAL AVERAGE: COLOR SCORE



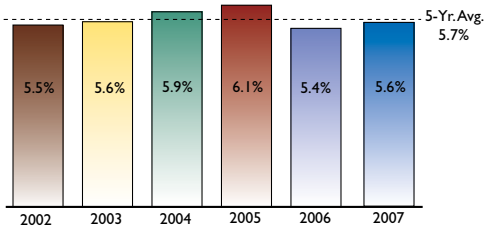
The regional average color score is 9.1 higher than last year and equal to the five-year average. Pasta samples with scores of 8.0 or higher have good color.

REGIONAL AVERAGE: COOKED WEIGHT (grams)



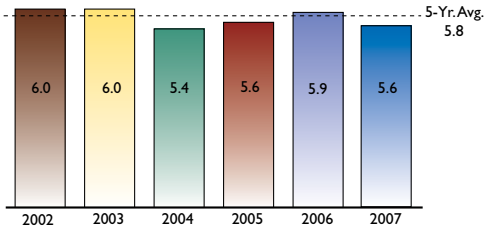
The regional average cooked weight is 32.2 grams, above last year and the five-year average.

REGIONAL AVERAGE: COOKING LOSS



The regional average cooking loss is 5.6 percent, higher than last year but below the five-year average.

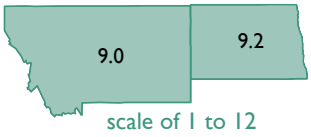
REGIONAL AVERAGE: COOKED FIRMNESS (g cm)



The regional average cooked firmness is 5.6 g cm, lower than last year and the five-year average.

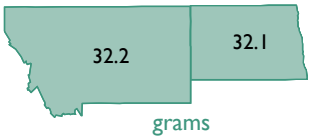
Photo credit: Wheat Foods Council

AVERAGE COLOR SCORE BY STATE



scale of 1 to 12

AVERAGE COOKED WEIGHT BY STATE



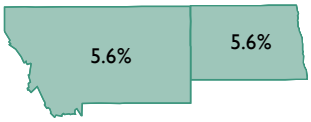
grams

Spaghetti Processing Properties

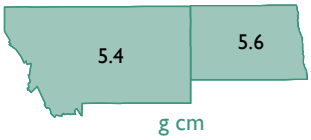
STATE AND CROP REPORTING AREA	COLOR SCORE (1-12)	COOKED WEIGHT G	COOKING LOSS %	COOKED FIRMNESS G CM
MONTANA (A-B)				
State Avg. 2007	9.0	32.2	5.6	5.4
State Avg. 2006	9.0	31.4	5.3	6.0
NORTH DAKOTA				
Area A-1	9.0	32.3	5.6	5.5
Area A-2	9.5	31.9	5.4	5.9
Area B-C	8.5	32.6	6.4	4.8
Area D	9.5	31.8	5.7	5.8
State Avg. 2007	9.2	32.1	5.6	5.6
State Avg. 2006	9.0	31.3	5.5	5.9
TWO-STATE REGION				
Avg. 2007	9.1	32.2	5.6	5.6
Avg. 2006	9.0	31.3	5.4	5.9
Five-Year Avg.	9.1	31.0	5.7	5.8

Note: All state and regional averages have been adjusted to reflect production differences.

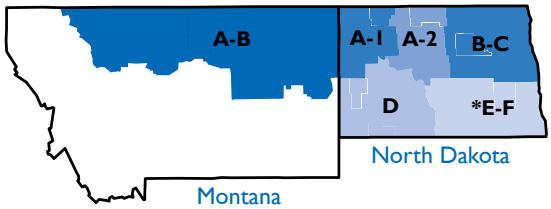
AVERAGE COOKING LOSS BY STATE



AVERAGE COOKED FIRMNESS BY STATE



g cm



* E-F: No data was collected from this region due to limited production.

Summary Information

Photo credit: David Lipp, Fargo, N.D.

Average Quality Factors for the Great Plains Durum Wheat Crop 2002-2007

	2002	2003	2004	2005	2006	FIVE-YEAR AVERAGE	2007
GRADING DATA							
Test Weight (lbs/bu)	59.9	61.0	61.7	60.8	59.9	60.7	59.9
(kg/hl)	78.0	79.4	80.3	79.2	78.0	79.0	78.0
Total Defects (%)	3.3	1.6	1.2	2.2	2.0	2.0	1.8
Vitreous Kernels (%)	85	92	89	91	90	89	95
Grade	2HAD	1HAD	1HAD	1HAD	2HAD	1HAD	2HAD
OTHER WHEAT DATA							
Dockage (%)	1.7	0.7	1.2	1.5	2.3	1.5	1.6
Protein: 12% Moisture (%)	14.0	14.5	13.4	13.4	15.1	14.1	15.1
1000 Kernel Weight (gm)	36.9	33.8	40.2	35.5	33.2	35.9	33.8
Ash (%)	1.56	1.53	1.50	1.67	1.53	1.56	1.67
Falling Number (sec)	292	391	356	378	385	360	367
Sedimentation (mm)	46	51	49	45	55	49	52
SEMOLINA DATA							
Total Extraction (%)	69.7	68.8	71.2	73.1	70.7	70.7	69.6
Semolina Extraction (%)	63.3	62.9	64.3	66.4	65.1	64.4	63.8
Ash (%)	0.67	0.66	0.64	0.71	0.72	0.68	0.76
Specks (no/10 sq in)	26	12	20	19	21	20	23
Protein (%)	13.0	13.5	12.4	12.6	14.3	13.2	13.9
Wet Gluten (%)	36.5	37.2	35.0	35.0	39.5	36.6	39.2
Gluten Index (%)	36.8	42.7	43.7	45.4	56.7	45.0	48.0
Mixograph Classification	6.0	6.0	6.0	6.0	5.8	5.9	5.4
SPAGHETTI PROCESSING DATA							
Color Score (scale of 1-12)	8.7	9.4	8.9	9.4	9.0	9.1	9.1
Cooked Weight (gm)	31.4	30.9	30.5	30.8	31.3	31.0	32.2
Cooking Loss (%)	5.5	5.6	5.9	6.1	5.4	5.7	5.6
Cooked Firmness (g cm)	6.0	6.0	5.4	5.6	5.9	5.8	5.6

Export Cargo Sampling

Export Cargo Data

	2005	2006
SAMPLE COUNT	40	18
GRADING DATA		
Test Weight (lbs/bu)	61.5	61.2
Test Weight (kg/hl)	80.0	79.7
Damaged Kernels (%)	2.0	1.6
Foreign Material (%)	0.2	0.2
Shrunken & Broken (%)	1.3	1.5
Total Defects (%)	3.4	3.2
Vitreous Kernels (%)	84	84
Grade	2HAD	2HAD
OTHER WHEAT DATA		
Dockage (%)	0.5	0.5
Moisture (%)	12.5	11.8
Protein: 12% Moisture (%)	13.3	14.3
Protein: Dry (%)	15.1	16.3
Ash: 14% Moisture (%)	1.61	1.60
Ash: Dry (%)	1.87	1.86
1000 Kernel Weight (g)	36.4	34.8
Kernel Size (%) lg/md/sm	52/42/7	35/57/8
Falling Number (sec)	399	440
SEMOLINA DATA		
Total Extraction (%)	71.8	71.2
Semolina Extraction (%)	64.6	64.4
Ash: 14% Moisture (%)	0.68	0.69
Ash: Dry (%)	0.79	0.80
Specks (no/10 sq in)	25.8	24.7
Protein: 14% Moisture (%)	12.3	13.2
Protein: Dry (%)	14.3	15.4
Gluten Index (%)	45.9	50.6
Mixograph Classification (scale of 1-8)	5.3	5.7
Color: L (white-black)	84.7	85.2
a (red-green)	-2.7	-2.6
b (yellow-blue)	24.9	26.3
SPAGHETTI PROCESSING DATA		
Color Score (scale of 1-12)	8.9	8.9
Cooked Weight (gm)	31.9	32.1
Cooking Loss (%)	5.9	5.5
Cooked Firmness (g cm)	5.1	5.4

Data contained in previous sections of this report are derived from the testing of samples gathered during harvest from origination points throughout the northern U.S. durum growing region. The results provide an assessment of the overall quality of the crop produced in a given year.

U.S. Wheat Associates, the export market development arm for American wheat growers, furthers this information by commissioning an export cargo sampling program. The program provides an accurate representation of the supplies moving through the grain marketing and transportation system and actually reaching export points. Results show the quality levels at which U.S. wheat is realistically traded and are useful to customers in developing reasonable purchase specifications.

The Federal Grain Inspection Service oversees the program whereby all export inspection agencies at all ports collect every tenth sublot sample from every vessel of U.S. wheat shipped during three two-month time periods annually.

The durum wheat samples are sent for analysis to the Durum Wheat Quality and Pasta Processing Laboratory in the North Dakota State University Plant Science Department.

Photo credit: USDA Agricultural Research Service

Laboratory Analysis

Photo credit: North Dakota State University

All quality data contained in this report is the result of testing and analysis conducted by or under the supervision of Dr. Frank A. Manthey, associate professor and Reena Dash and Brent Hinsz, food technologists of the Durum Wheat Quality and Pasta Processing Laboratory in the Department of Plant Science at North Dakota State University, Fargo, USA.

COLLECTION · The North Dakota and Montana state offices of the National Agricultural Statistics Service obtained durum wheat samples during harvest directly from growers, farm bins and local elevators. These samples reflect the condition of the grain at the point of origin. Collection began the first week of August when approximately 5 percent of North Dakota's durum crop had been harvested and continued until mid-September when harvest was mostly complete. A total of 218 samples were collected during harvest from Montana (45) and North Dakota (173).

ANALYSIS · Half of the total wheat samples collected were analyzed for grade and other physical kernel characteristics. The data obtained from the analyses were used to generate frequency distributions as a percentage of the harvested crop. Distribution results may differ from data presented in the various tables, because the latter are derived from production adjusted averages, rather than simple averages.

All samples received in the laboratory were sub-sampled to obtain one composite sample for each of the five areas in North Dakota and one composite for Montana. These were analyzed for grade and physical characteristics as well as milling performance and spaghetti processing qualities. Again, all state and regional averages have been adjusted to reflect production as opposed to simple averaging.

Methods, Terms & Symbols

Wheat

Sample Collection • Each sample contained approximately 2 to 3 pounds of wheat, stored in securely closed, moisture proof plastic bags.

Moisture • Official USDA procedure using Motomco Moisture Meter.

Grade • Official United States Standards for Grain, as determined by a licensed grain inspector. North Dakota Grain Inspection Service, Fargo, ND, provided grades for composite wheat samples representing each crop reporting area.

Vitreous Kernels • Approximate percentage of kernels having vitreous endosperm, based on weights.

Dockage • Official USDA procedure. All matter other than wheat which can be removed readily from a test portion of the original sample by use of an approved device (Carter Dockage Tester). Dockage may also include underdeveloped, shriveled and small pieces of wheat kernels removed in properly separating the material other than wheat and which cannot be recovered by properly rescreening or recleaning.

Test Weight • American Association of Cereal Chemists Method 55-10 approved April 1961, revised October 1999. Measured as pounds per bushel (lb/bu), kilograms per hectoliter (kg/hl) = (lbs/bu X 1.292) + 0.630. Approved Methods of the American Association of Cereal Chemists, Cereal Laboratory Methods (10th Edition), St. Paul, MN (2000).

Thousand Kernel Weight • Based on 10 gram sample of cleaned wheat (free of foreign material and broken kernels) counted by electronic seed counter.

Kernel Size Distribution • Determinations made according to the procedure described in Cereal Science Today 5:(3), 71 (1960). Kernels remaining over a Tyler No. 7 (2.92 mm opening) are classified as "large;" kernels passing through the top sieve but remaining on a Tyler No. 9 (2.24 mm opening) are classified as "medium" size kernels. Kernels passing through the second sieve are classed as "small." Size is reported as percentage of large, medium, and small kernels.

Protein • American Association of Cereal Chemists (AAC) Method: 46-30 (Combustion Method), expressed on dry basis and 12 percent moisture basis.

Ash • American Association of Cereal Chemists Method 08-01, approved April 1961, revised October 1999; expressed on a 14 percent moisture basis.

Falling Number • American Association of Cereal Chemists Method 56-81B, approved November 1972, revised September 1999; units of seconds (14 percent moisture basis).

Micro Sedimentation • Determined as described by Dick, J.W. and Quick, J.S. Cereal Chem. 60(4):315-318, 1983.

Wet Gluten • American Association of Cereal Chemists Method 38-12, approved October 1999; expressed on a 14 percent moisture basis determined with the glutomatic instrument.

Gluten Index • American Association of Cereal Chemists Method 38-12, approved October 1999; determined with the glutomatic instrument as an indication of gluten strength.

Semolina

Extraction • AACC Method 26-41 (modified for the Buhler Mill). Expressed on a total product basis.

Ash • AACC Method 08-01, approved April 1961, revised October 1999; expressed on a 14 percent moisture basis.

Protein • AACC Method 46-30 (combustion method), approved September 1995, revised October 1999, N x 5.7, expressed on a 14 percent moisture basis.

Specks • The number of specks in semolina was determined on a flat surface under a constant light source, and counting the visible specks (brown and black particles) in three different one-inch square areas. The average of the three readings was converted to the number of specks per 10 square inches.

Mixograph • Mixograph evaluation of semolina was performed according to the AACC Method 54-40A with some modifications: Ten grams of semolina (weighed on 14 percent moisture basis) were mixed for 8 min at constant water absorption of 5.8 ml, using a spring setting of 8. The mixograms were scored by comparing them to reference mixograms. A scale of 1 to 8 is employed, higher values indicate strong mixing characteristics (see reference mixogram chart).

REFERENCE MIXOGRAMS FOR DURUM WHEAT

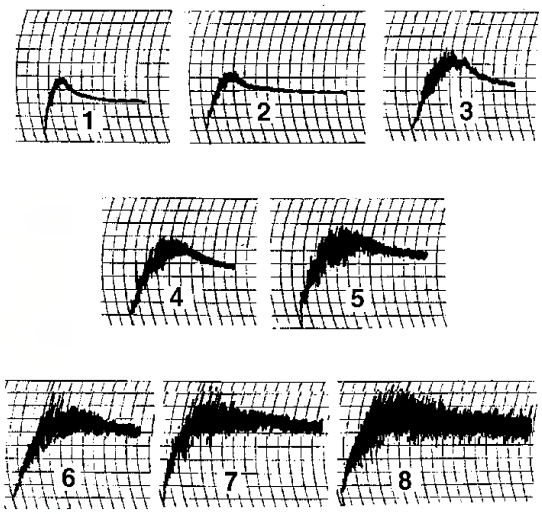


Photo credit: USDA Agricultural Research Service

SPAGHETTI

PROCESSING • Pasta was made using the laboratory procedure described by Walsh, Ebeling, and Dick, *Cereal Sci. Today*: 16(11) 385, 1971. A 1-Kg semolina was mixed with the appropriate amount of water that gave a dough consistency of 32 percent total water absorption. The other processing conditions used were: Water temperature, 40 C, extruder shaft speed, 25 rpm and vacuum, 18 in. Hg; the dough was pressed through an 84-strand teflon-coated spaghetti die with 0.157 cm openings. The extruded spaghetti samples were dried at high temperature for 12 hrs, using maximum temperature and relative humidity of 73 C and 83 percent respectively.

COLOR • Color scores were determined by light reflectance (AACC Method 14-22, 1983), using a Minolta Color Difference Meter (Model CR 310, Minolta Camera Co., Japan). The scores were generated according to the new color map designed by Debbouz (Pasta J. vol 6, No 6, 1994). A spaghetti sample with a score of 8.0 or higher is considered to have good color.

COOKED WEIGHT • AACC Method 66-50 with some modifications: 10 g of dry spaghetti were placed in 300 ml boiling distilled water and cooked for 12 min. The cooked and drained spaghetti sample was weighed and the results were reported in grams.

COOKING LOSS • AACC Method 66-50. Solids lost to the cooking water. After drying the residue was weighed and reported as percentage of the original dry sample.

FIRMNESS • AACC Method 66-50 with a plexiglass tooth attached to a Texture Analyzer (Model TA-XT2, Texture Technology Corp., Scarsdale, New York).

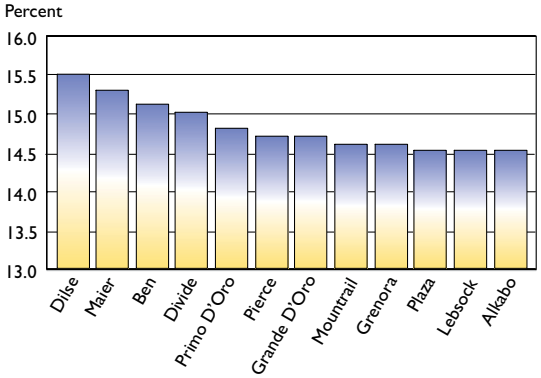
Varietal Information

Photo credit: Bernard Anderson, Warwick, N.D.

Quality products begin with quality ingredients. In the case of wheat, quality begins with the varieties planted. Within the durum class of wheat, there are different varieties available—all with relatively uniform characteristics. A public plant breeder at North Dakota State University in Fargo develops and releases most of the durum varieties grown in the northern region, although some private firms also have durum breeding programs. Before any durum variety is released to the public, it must meet or exceed current standards for the class. Prospective releases are evaluated for milling and pasta characteristics as well as for yield, protein content, test weight, resistance to diseases and insects, and straw strength.

Traditionally, northern grown durum is known for its high protein content, good "yellow" color and high semolina extraction.

WHEAT PROTEIN CONTENT COMPARISON (12% MOISTURE CONTENT)



TEST WEIGHT COMPARISON

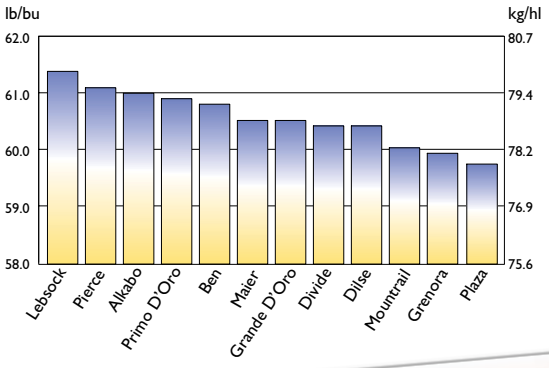


Photo credit: David Lipp, Fargo, N.D.

Varietal Information

Popular and New Durum Wheat Varieties

GROWN & TESTED IN NORTH DAKOTA • AGRONOMIC FACTORS

VARIETY	AGENT[1] OR ORIGIN	YEAR RELEASED	AGRONOMIC DESCRIPTION STRAW STENGTH	AGRONOMIC DESCRIPTION MATURITY	REACTION TO DISEASE[2] LEAF RUST	REACTION TO DISEASE[2] FOLIAR DISEASE	REACTION TO DISEASE[2] HEAD (SCAB)	AVERAGE YIELD EASTERN[3] NORTH DAKOTA BU/ACRE	AVERAGE YIELD EASTERN[3] NORTH DAKOTA MT/HA	AVERAGE YIELD WESTERN[4] NORTH DAKOTA BU/ACRE	AVERAGE YIELD WESTERN[4] NORTH DAKOTA MT/HA
Alkabo	ND	2005	v. strg.	med.	R	M	MS	62.2	4.18	42.8	2.88
Alzada	WB	2004	strg.	early	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Ben	ND	1996	strg.	med.	R	MR	S*	53.3	3.58	40.2	2.70
Dilse	ND	2002	strg.	late	R	M	MS	54.6	3.67	38.8	2.61
Divide	ND	2005	strg.	med.	R	M	MR	61.9	4.16	38.5	2.59
Grande D'Oro	WB/DGP	2005	m. strg.	med.	R	M	n/a	54.7	3.68	n/a	n/a
Grenora	ND	2005	strg.	med.	R	M	MS	62.1	4.17	43.4	2.92
Lebsock	ND	1999	strg.	med.	R	M	MS	60.7	4.08	n/a	n/a
Maier	ND	1998	strg.	m-late	R	M	S*	53.8	3.61	40.5	2.72
Monroe	ND	1985	med.	early	R	M	VS	n/a	n/a	n/a	n/a
Mountrail	ND	1998	strg.	late	R	M	S*	62.7	4.21	42.8	2.88
Pierce	ND	2001	m. strg.	med.	R	MS	S	58.6	3.94	39.0	2.62
Plaza	ND	1999	v. strg.	late	R	M	MS	n/a	n/a	n/a	n/a
Primo D'Oro	WB/DGP	2004	med.	m. early	R	MS	n/a	49.6	3.33	n/a	n/a

Source: 2007 North Dakota Durum Wheat Variety Performance Descriptions

1 ND–North Dakota State University, WB/DGP–Westbred/Dakota Growers Pasta.

2 Reaction to Disease: resistant (R), moderately resistant (MR), intermediate (M), moderately susceptible (MS), susceptible (S), very susceptible (VS). *Indicates yield and/or quality have often been higher than would be expected based on visual head blight symptoms alone.

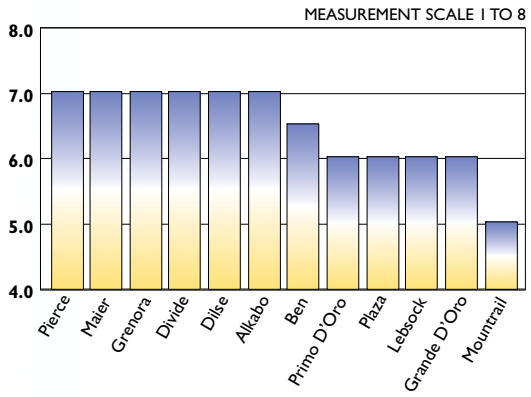
3 2005-07 data from Prosper, Carrington and Langdon locations in North Dakota.

4 2005-07 data from Williston, Dickinson and Hettinger locations in North Dakota.

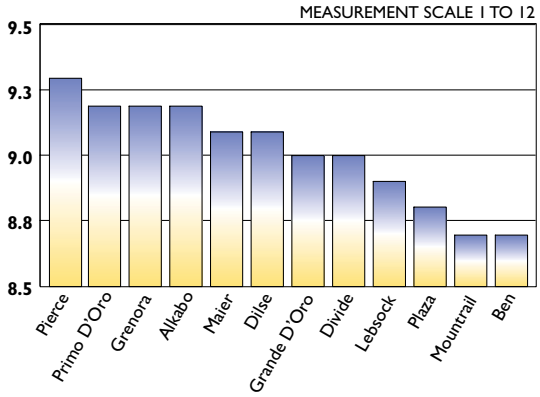
5 Based on NDSU Durum Quality Lab testing of samples grown at multiple North Dakota locations during 2002-2006.

6 Based on kernel attributes, milling and semolina processing, pasta color, and spaghetti cooking performance.

MIXOGRAPH COMPARISON



PASTA COLOR COMPARISON



Note: This data is based on testing from multiple North Dakota growing locations during the 2002-2006 seasons.

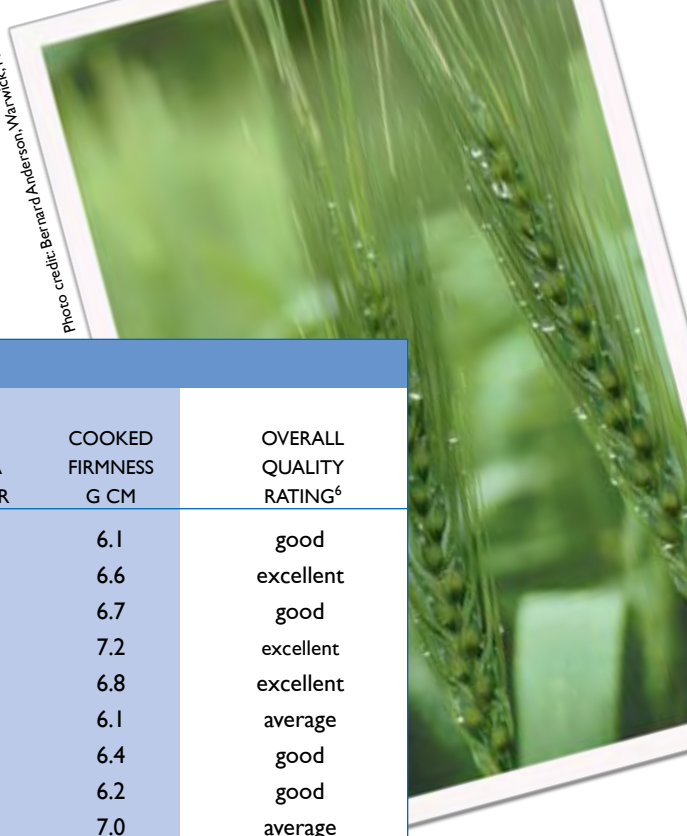


Photo credit: Bernard Anderson, Warwick, N.D.

GROWN & TESTED IN NORTH DAKOTA • QUALITY & END-USE FACTORS

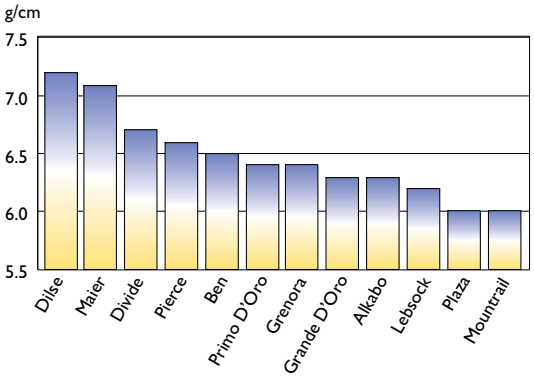
	QUALITY FACTORS[5]							
VARIETY	TEST WEIGHT LB/BU	WHEAT PROTEIN %	WHEAT FALLING# SECONDS	SEMOLINA EXTRACT %	MIXOGRAM SCORE (SCALE 1-8)	PASTA COLOR	COOKED FIRMNESS G CM	OVERALL QUALITY RATING[6]
Alkabo	60.6	15.0	439	63.7	7.0	9.4	6.1	good
Alzada	60.0	14.7	579	65.4	8.0	9.6	6.6	excellent
Ben	60.5	15.6	411	65.0	7.0	8.8	6.7	good
Dilse	59.9	16.2	400	64.4	7.0	9.3	7.2	excellent
Divide	60.1	15.3	454	64.4	7.0	9.1	6.8	excellent
Grande D'Oro	60.9	14.8	410	64.6	6.0	9.2	6.1	average
Grenora	59.6	15.1	478	63.5	7.0	9.6	6.4	good
Lebsock	61.0	15.1	444	64.9	6.0	9.1	6.2	good
Maier	60.3	15.8	414	64.9	7.0	9.2	7.0	average
Mountrail	59.4	15.2	431	64.1	5.0	8.9	6.1	average
Pierce	60.1	15.5	427	63.3	7.0	9.3	6.9	excellent
Plaza	59.8	15.3	467	64.0	6.0	9.2	6.2	average
Primo D'Oro	60.9	15.3	414	64.2	6.0	9.4	6.6	good

Photo credit: David Lipp, Fargo, N.D.

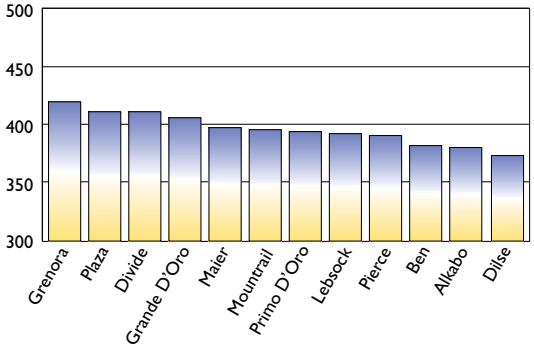
Environment influences the quailty of varieties across growing areas and planting years. For this reason, wheat breeders use "check" or reference varieties to evaluate quality in experimental varieties. They usually test and analyze quality data from multiple years and growing locations before a variety is released.

Breeders are working towards future varieties that have enhanced color and gluten strength, all important quality factors for end-users.

COOKED FIRMNESS COMPARISON



WHEAT FALLING NUMBER COMPARISON



NORTH DAKOTA

Leading durum varieties planted in North Dakota in 2007 are Lebsock, Mountrail and Pierce. Together the top three varieties account for 65 percent of planted acres in 2007. Durum acres showed little significant changes according to the June survey conducted by USDA's North Dakota Agricultural Statistics Service.

LEBSOCK remained the top durum variety in North Dakota for the fourth straight year with 28.3 percent of acres. It also accounts for 10 percent of the acres in Montana. Lebsock enjoys broad appeal across North Dakota. It has good disease tolerance, very high test weights, is one of the highest yielding varieties statewide and has good end-use quality.

PIERCE beat out Ben for the third place spot with 13 percent of acres. It has excellent end-use quality with a strong agronomic showing in recent years.

BEN held onto 12 percent of acres most of which are in southwest North Dakota. A 1996 release, Ben continues to slowly lose acres to other newer releases. It is rated good for quality.

DIVIDE, a promising new variety, made the top 10 list with 1.7 percent of acres. Divide has excellent end-use quality, strong yields and a very high level of disease resistance. It will likely see expanded acres in the 2008 season.

DURUM WHEAT VARIETIES PLANTED ACRES IN NORTH DAKOTA

VARIETY	2006 %[1]	2007 %[1]	2007 ACRES (1,000)
Lebsock	29.7	28.3	425.2
Mountrail	27.3	23.8	357.3
Pierce	8.4	13.1	196.4
Ben	13.4	11.7	175.1
Dilse	4.0	3.8	56.7
Kyle	3.0	3.0	44.5
Maier	4.3	2.3	34.2
Divide	0.0	1.7	26.0
Monroe	0.7	1.7	26.0
Plaza	0.1	1.4	21.1
Grande D'Oro	0.2	1.3	19.5
Primo D'Oro	1.5	1.0	14.3
Other[2]	7.4	6.9	103.7
All Varieties	100.0	100.0	1,500.0[3]

1/ Percentages may not add to 100 due to rounding.
2/ Other includes other varieties not listed and unknown varieties.
3/ Based on June 2007 survey. September 29, 2007 estimate remains 1.48 million acres.

NORTH DAKOTA AGRICULTURAL STATISTICS DISTRICTS 2007 PLANTED AREA (1,000 ACRES)

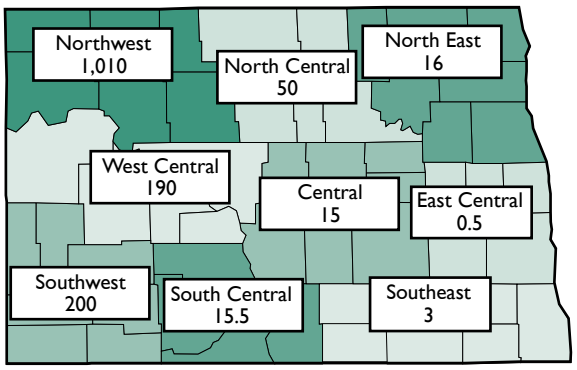


Photo credit: North Dakota Mill

Photo credit: David Lipp, Fargo, N.D.

DURUM WHEAT VARIETIES IN NORTH DAKOTA
SHARE OF 2007 PLANTINGS BY CROP DISTRICT

VARIETY	NORTH WEST	NORTH CENTRAL	NORTH EAST	WEST CENTRAL	CENTRAL	EAST CENTRAL	SOUTH WEST	SOUTH CENTRAL	SOUTH EAST	TOTAL STATE
					PERCENTAGE (%)[1]					
Lebsock	28.8	36.4	38.8	22.8	94.7	0.0	19.3	69.7	100.0	28.3
Mountrail	31.6	0.0	0.0	17.7	0.0	0.0	1.2	10.3	0.0	23.8
Pierce	14.5	12.2	0.0	21.8	0.0	0.0	0.9	0.0	0.0	13.1
Ben	5.1	0.0	0.0	2.4	0.0	100.0	58.0	16.1	0.0	11.7
Dilse	4.2	0.0	0.0	1.3	0.0	0.0	6.1	0.0	0.0	3.8
Kyle	4.4	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
Maier	0.5	0.0	0.0	11.9	0.0	0.0	3.3	0.0	0.0	2.3
Divide	1.0	6.2	31.2	3.6	2.7	0.0	0.4	0.0	0.0	1.7
Monroe	1.1	0.0	0.0	7.4	0.0	0.0	0.0	3.9	0.0	1.7
Plaza	0.7	0.0	0.0	7.5	0.0	0.0	0.0	0.0	0.0	1.4
Grande D'Oro	1.8	22.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3
Primo D'Oro	0.8	5.4	20.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Other[2]	6.5	16.0	10.0	3.6	2.6	0.0	10.8	0.0	0.0	6.9
					1,000 ACRES					
All Varieties	1,010	50	16	190	15	0.5	200	15.5	3.0	1,500[3]

1/ Percentages may not add to 100 due to rounding.
2/ Other includes other varieties not listed and unknown varieties.
3/ Based on June 2007 survey for district level data. Total acres in September 29, 2007 small grains estimate are 1.48 million acres.

MONTANA

A survey conducted by USDA's Montana Agricultural Statistics Service shows the most popular varieties of durum wheat are Mountrail, Kyle, Lebsock and Alzada, which account for 76 percent of acres.

MOUNTRAIL is the dominant variety in Montana and is second in North Dakota, at 42 and 24 percent of acres, respectively. Its popularity is primarily contained to major production areas of northwest North Dakota and northeast Montana, where it remains one of the highest yielding varieties. Mountrail is rated average for end-use quality.

KYLE remains the second ranked variety in Montana with 15 percent of acres, but is down for the second year in a row. Kyle has good end-use quality with competitive yields, but is a tall variety with weak straw.

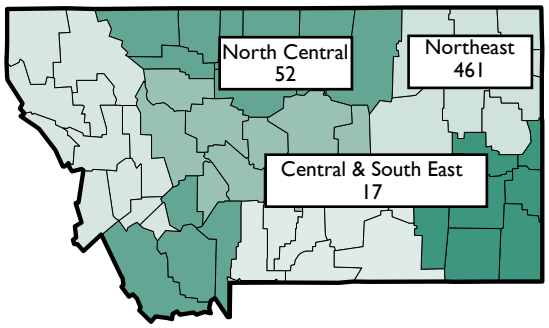
ALZADA is the fourth place variety and had the largest percentage growth in 2005, and again saw growth in 2006. It is a 2004 release from Westbred, LLC. Alzada is a semi-dwarf variety noted for its excellent quality which produces a bright yellow semolina.

DURUM WHEAT VARIETIES PLANTED ACRES IN MONTANA

VARIETY	2006 %[1]	2007 %[1]	2007 ACRES (1,000)
Mountrail	52.6	41.8	221.3
Kyle	15.7	14.7	77.9
Lebsock	10.1	11.6	61.3
Alzada	4.8	8.2	43.5
Pierce	5.6	5.0	26.3
Dilse	0.8	2.6	13.8
Grande D'Oro	0.0	1.7	9.2
Ward	2.3	1.5	7.8
Strongfield	0.0	1.2	6.5
Monroe	0.6	1.2	6.5
AC Avonlea	2.3	1.0	5.1
Divide	0.0	0.7	3.7
Other & Unknown[2]	5.2	8.8	47.1
All Varieties	100.0	100.0	530.0[3]

1/ Percentages may not add to 100 due to rounding.
2/ Other includes other varieties not listed and unknown varieties.
3/ June MASS estimates. Final September estimate is 480,000 acres.

MONTANA AGRICULTURAL STATISTICS DISTRICTS 2007 PLANTED AREA (1,000 ACRES)



DURUM WHEAT VARIETIES IN MONTANA SHARE OF 2007 PLANTED ACRES BY CROP DISTRICT

VARIETY	NORTH CENTRAL	NORTH EAST	CENTRAL & SOUTH EAST	TOTAL STATE
	PERCENTAGE (%)[1]			
Mountrail	0.0	48.0	0.0	41.8
Kyle	3.5	16.5	0.0	14.7
Lebsock	0.0	13.3	0.0	11.6
Alzada	70.4	1.5	0.0	8.2
Pierce	0.0	5.7	0.0	5.0
Dilse	0.0	3.0	0.0	2.6
Grande D'Oro	0.0	2.0	0.0	1.7
Ward	0.0	1.7	0.0	1.5
Monroe	0.0	1.4	0.0	1.2
Strongfield	0.0	1.4	0.0	1.2
AC Avonlea	0.0	1.1	0.0	1.0
Divide	0.0	0.8	0.0	0.7
Other[2]	26.1	3.6	100.0	8.8
	1,000 ACRES			
All Varieties	52	461	17	530[3]

1/ Percentages may not add to 100 due to rounding.
2/ Other includes other varieties not listed and unknown varieties.
3/ June MASS estimates. Final September 29, 2007 small grains estimate is 480,000 acres.

Handling & Transportation

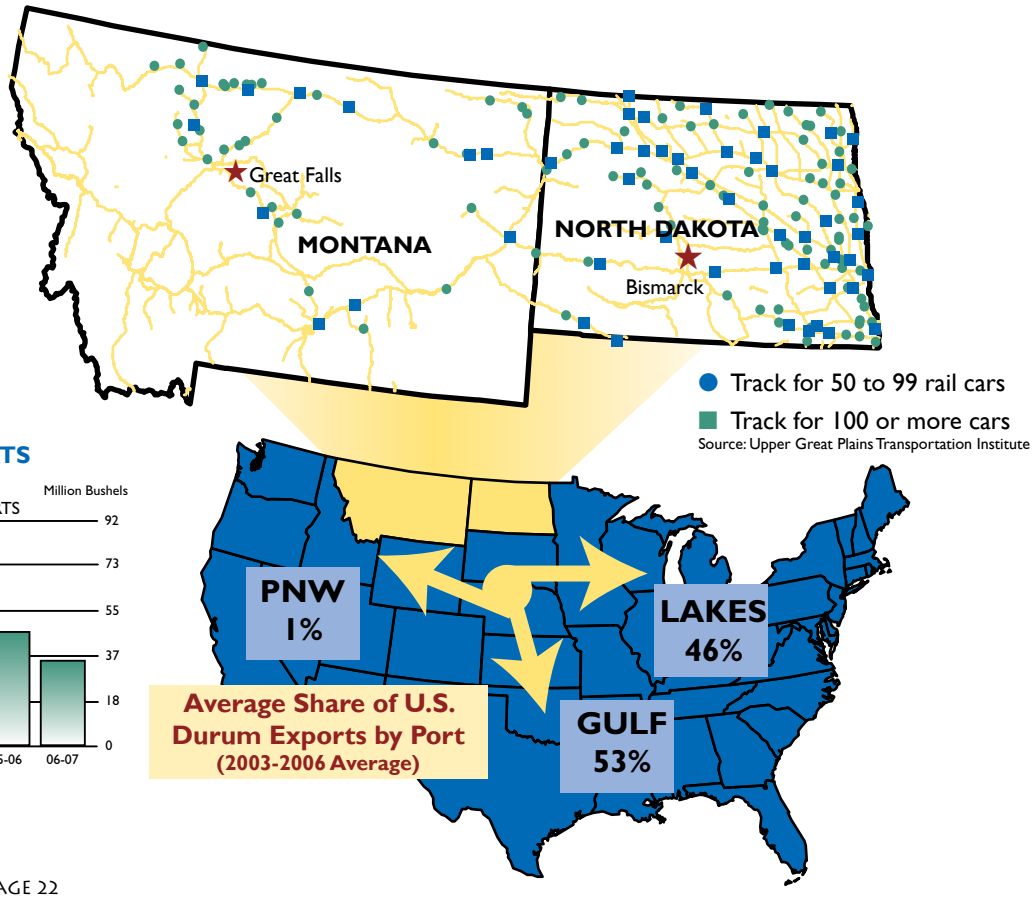
The durum wheat growing region in the Northern Plains has a vast network of country elevators to facilitate efficient and precise movement to domestic and export markets. On average, nearly 80 percent of the region's wheat moves to markets by rail. Duluth is the only export market easily serviced by trucks. Shipments to the Pacific Northwest and Gulf export markets are almost entirely by rail, with some barge movement to the Gulf. The dominant railroad is the Burlington Northern Santa Fe, followed by the Canadian Pacific.

A growing number of elevators in the region are investing to ship 100 car units. Each rail car holds approximately 3,500 bushels (95 metric tons) of wheat. Some of the 100-car shippers have invested in "shuttle" capabilities. Shuttle-equipped facilities receive the lowest rates, sharing volume and transaction efficiencies with the railroad.

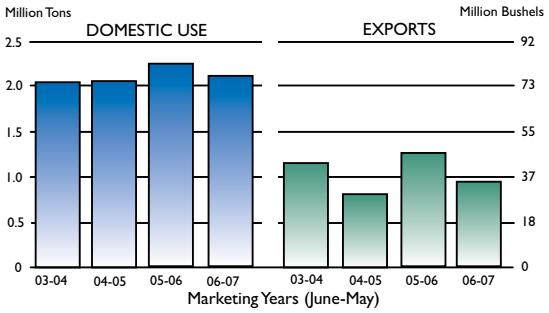
The diverse rail shipping capacities and widespread network of elevators are strengths buyers can capitalize on, especially as their demand heightens for more precise quality specifications and consistency between shipments. Buyers are increasingly exploring origin-specific shipments. Many international buyers now find it possible to request wheat from certain locations to optimize the quality and value of wheat they purchase.

The rail and elevator network in the U.S. northern grown durum region is well suited for meeting the increasing quality demands of both domestic and international customers.

Grain Handling and Transportation Facilities in the U.S. Northern Grown Durum Region



2003-2006 U.S. DURUM DOMESTIC USE & EXPORTS



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